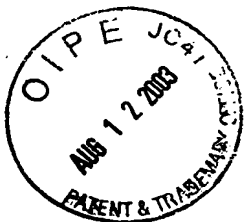


383



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appl. No. : 09/671,301 Confirmation No.: 8390  
Applicant : KITAYAMA et al.  
Filed: : September 28, 2000  
TC/A.U. : 1774  
Examiner : Cynthia Kelly  
Docket No. : 7372/70931

RECEIVED  
AUG 15 2003  
TC 1700

August 12, 2003

APPEAL BRIEF

Commissioner for Patents  
U.S. Patent and Trademark Office  
2011 South Clark Place  
Customer Window, Mail Stop Appeal Brief - Patents  
Crystal Plaza Two, Lobby, Room 1B03  
Arlington, VA 22202

Dear Sir:

Appellants submit their Appeal Brief pursuant to 37 C.F.R. §1.192.

(1) Real Party In Interest

The real party in interest is Sumitomo Chemical Company, Ltd.

(2) Related Appeals and Interference

As presently imformed, there are no other appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

Appellants present appeal concerns claims 1, 2, 4, 5 and 6. Claim 3 will have been canceled without prejudice or disclaimer, as discussed below, upon entry of the las-filed Amendment.

**(4) Status of Amendments**

Appellants June 12, 2003 Amendment is entered for purposes of Appeal. See Advisory Action dated June 24, 2003 at box 7(b).

**(5) Summary of the Invention**

Appellants developed a fiber reinforced composite material that exhibits a sufficient adhesiveness between reinforcing fibers and a matrix resin and has excellent mechanical properties without being subjected to any special treatment and whose products can be directly recycled and used without the removal of the reinforcing fibers. Specification, page 2.

**Background to the invention**

It is well known that a fiber reinforced composite material wherein reinforcing fibers are covered with a matrix resin has excellent mechanical properties which can not be exhibited by a single material. Specification, page 1.

For example, polypropylene-based composite materials reinforced with glass fibers, carbon fibers or the like are known as typical composite materials. In such composite materials, reinforcing fibers provide mechanical strength such as a tensile modulus and a matrix resin adheres to the reinforcing fibers to wrap them. Specification, page 1.

In the aforementioned composite materials the reinforcing fibers and the matrix resin are formed from diffrent kinds of materials. However, it has proven difficult to improve the adhesiveness between the reinforcing fibers and the matrix resin. For example, in the case of the above-mentioned polypropylene-based composite material reinforced with glass fibers, various approaches to solving the problem have apparently included coating glass fibers with a resin or a finishing agent that adheres to a polypropylene-based resin, or using a

customized matrix resin, such as a maleic acid-modified polypropylene-based resin, having good adhesiveness to glass fibers. Specification, page 1.

Moreover, in the case of polypropylene-based composite materials in which glass fibers or carbon fibers are mixed or inserted, it has been very difficult for the glass fibers or carbon fibers to be separated from the composite materials. However, when composite materials are discarded or processed for recycling, the materials must be separated. For instance, glass fiber reinforced or carbon fiber reinforced polypropylene-based resin must be separately recycled. Thus, since the products to be recycled must be separated into recyclable components, but the separation is difficult and expensive, there is an economic disincentive with the consequent environmental problem of what to do with mixed composites. See, Specification, page 2.

**Appellants' solution: the Claimed Invention**

Appellants solution comprises a fiber reinforced polypropylene-based composite material comprising reinforcing fibers and a matrix resin, wherein the reinforcing fibers and the matrix resin are made of different polypropylene-based resins and wherein a melting point,  $T_m(F)$ , of the polypropylene-based resin which is the material forming the reinforcing fibers and a melting point,  $T_m(M)$ , of the polypropylene-based resin which is the matrix resin satisfy  $T_m(F) - T_m(M) > 10^\circ\text{C}$ . Specification, pages 2-3.

A nucleating agent is an additive in the propylene-based resin which is the material forming the reinforcing fibers, specification, page 5. The nucleating agent may in principle improve the adhesiveness between the resin forcing fibers and the matrix resin. Id.

The polypropylene-resin material forming the reinforcing fibers can be a propylene homopolymer. Reinforcing fibers made from a propylene homopolymer have a high tensile modulus and a fiber reinforced polypropylene-based composite material incorporating such fibers can exhibit excellent mechanical strength. Specification at page 7. The propylene homopolymer can have a melting point, ( $T_m(F)$ ), of not less than  $155^\circ\text{C}$ , page 4, last two lines to page 5, and original claim 2. The resin can also be a copolymer of propylene and ethylene and/or  $\alpha$ -olefin having four or more carbon atoms. Specification, page 8.

Appellants approach will avoid the undesired environmental challenges associated with mixed composites.

The reinforcing fibers are mixed or inserted into the matrix resin. The reinforcing fibers can be in the form of a fleece, a woven fabric or a knitted fabric. Specification, page 6.

The reinforcing fibers can be oriented in one direction. Specification, page 6. This enables the practitioner to manufacture composites with certain mechanical properties and performance characteristics.

The reinforcing fibers can have an average fiber diameter of from 6 to 100  $\mu\text{m}$ . Specification, page 6.

**(6) Issues**

Whether each of claims 1, 2, 4, 5, 6 and 7 defines an unobvious invention under 35 U.S.C. §103(a) over U.S. Patent No. 4,894,281 ("Yagi") when taken in view of U.S. Patent No. 6,203,600 B1.

Appellants respectfully submit that the broadly stated issue includes whether there is no *prima facie* case of obviousness.

**(7) Grouping of Claims**

Appellants respectfully submit that the claims do not necessarily stand or fall together.

**(8) Argument**

Applicants respectfully traverse the rejections of claims 1-6 under 35 U.S.C. §103(a) over Yagi et al. (USP 4,894,281) in view of Nakajima (USP 6,207,600 B1).

The references would not have been combined. And, even if they were, their combination would not have taught the Applicants' inventions.

Facts are critical because otherwise there is no basis upon which to reach the ultimate legal determination of whether an invention would have been obvious under 35 U.S.C. § 103(a).<sup>1</sup> Thus, particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed. *See, e.g., In re Kotzab*, 217 F.3d 1365, 1371, 55 U.S.P.Q. 2d (BNA) 1313, 1317 (Fed. Cir. 2000). That is there must be evidence that "a skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would selected the elements from the cited prior art references for combination in the manner claimed. *See, e.g., In re Rouffet*, 149 F.3d at 1357, 47 U.S.P.Q. 2d (BNA) at 1456. "[A] rejection cannot be predicted on the mere identification ... of individual components of claimed limitations." *In re Kotzab*, 217 F.3d at 1371, 55 U.S.P.Q. 2d (BNA) at 1317.

**a. Claim 1 would have been unobvious.**

Claim 1 defines a fiber reinforced polypropylene-based composite material. The composite material comprises polypropylene fibers dispersed in a polypropylene matrix. The polypropylenes are different. Claim 1 recites that a melting point,  $T_m(F)$ , of the polypropylene-based resin from which the reinforcing fibers may be formed and a melting point,  $T_m(M)$ , of the polypropylene-based resin which is the matrix resin satisfy a certain relationship defined by the formula:  $T_m(F) - T_m(M) > 10^{\circ}\text{C}$ . Claim 1 also requires a nucleating agent be included in the polypropylene-based resin forming the reinforcing fibers.

The cited references neither disclose nor, even if combined (which is not conceded) would they have suggested the invention of claim 1.

**The Yagi reference admittedly does not disclose the elements of claim 1.**

Yagi et al. does not show that fibers have melting points, nucleating agents, and average fiber diameters as in the instant invention. The Final Rejection, at page 2, includes

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<sup>1</sup> The Examiner has not supplied an Examiner's Declaration. *See*, Amendment, June 12, 2003 at page 5, as a for instance.

the passing observation “Yagi does not specifically show these parameters ...” Appellants respectfully call attention to these statements in the Office Actions:

- 1) The “Yagi [reference] does not specifically show that the fibers have a melting point such that the formula of claim 1 is satisfied.” Prior Office Action, page 2.
- 2) The “Yagi [reference] does not specifically show that a nucleating agent is added to the fibers as in instant claim 3.” Prior Office Action, page 2.
- 3) The “Yagi [reference] does not show that the fibers have an average fiber diameter as in instant claim 6.” Prior Office Action, page 2.

Yagi teaches against the present invention that it eschewed polypropylene fibers in favor of specific UHMWPE disclosed and claimed. The Yagi et al. reference is characterized by using a molecularly oriented and silane-crosslinked ultra-high-molecular-weight polyethylene fiber in a fiber-reinforced polymer molded body (Abstract). Appellants therefore respectfully submit it is mistaken to rely on the Yagi reference at column 6, lines 11-32 in rejecting the pending claims. Contrary to the Office Action, Appellants respectfully submit there is no description of “polypropylene fibers” in the Yagi reference at column 6, lines 11-32. The Yagi reference is explicitly referring to a special class of polymers, namely “ultra-high-molecular-weight polyethylene naming an intrinsic viscosity  $[\eta]$  of at least 5 dl/g...” The recited UHMWPE is not a PPE resin, and a UHMWPE fiber is not a PPE fiber. Further, even if the Yagi reference mentions that an UHMWPE may contain a “small amount of other  $\alpha$ -olefin,” the thus described UHMWPE co-polymer with its “small amount of other  $\alpha$ -olefin” is not polypropylene, nor a polypropylene fiber. No other fibers are described or suggested in the Yagi reference at column 6, lines 11-32. Therefore the Yagi reference would not have suggested jettisoning its requirement for a UHMWPE fiber in favor of a polypropylene fiber.

**There would have been no motivation to combine the Yagi and nakajima references.**

Appellants respectfully submit that there would have been no reasonable motivation for combining the Yagi and Nakajima references and no motivation to have led a person of ordinary skill in the art to the relationship between the polypropylene resin for forming the fibers to the polypropylene resin forming the matrix.

It is respectfully submitted that neither of the two cited references would have provided a person of ordinary skill in the art with the motivation to destroy the predicate for the invention of the Yagi reference by stripping out the UHMWPE fibers and replacing them with other fibers in order to satisfy the relationship defined by the formula in claim 1.

Applicants respectfully emphasize that the Nakajima reference would not have provided the suggestion or motivation to use polypropylene fibers containing nucleating agents as the reinforcement for a thermoplastic. For example, it would appear contrary to the statements in the Office Action dated December 12, 2002 at page 3, no fiber reinforced moldings are disclosed in column 1, lines 6-13. Nakajima only discloses a certain specific fiber (claim 1), primary fiber products such as knit fabric and fiber-processed products (column 9, lines 53-58), and secondarily processed products such as those described in column 10, lines 16-34. Although Nakajima teaches a concrete reinforcement material column 10, line 32-33, it does not teach any reinforcement material for a matrix of plastic. Accordingly, Nakajima would not have suggested to or led a person of ordinary skill in the art to use a fiber-reinforced “plastic” moldings, to use the reinforcement fibers of polypropylene resin and polypropylene matrix to promote recycling, or to use the polypropylene resin fibers and polypropylene matrix having a defined interrelationship (such as the claim 1 formula).

Appellants respectfully submit that to the extent that the Office Action implies an aspect of the claimed invention is inherent (Office Action at page 3), it is misplaced. First, the record includes the passing acknowledgement that “Yagi does not specifically show these parameters” as seen from the quotations above.

Appellants further respectfully submit the Office Action at page 3 reflects a mistaken application of law and fact with what appears to be an bare unsupported that the

'combination of Yagi and Nakajima ... could satisfy the formula, absent any evidence to the contrary." Speculation over what might be, or 'could be' is not evidence of what would have been disclosed and would have been taught to a person of ordinary skill in the art. *See, e.g., In re Lee*, 277 F.3d 1338, 1344 61 U.S.P.Q.2D (BNA) 1430, 1434 (Fed. Cir. 2002) (rejections relying on "common knowledge and common sense" did not fulfill the obligation to cite references to support its conclusions). Thus, merely asserting that some parameters, *e.g.*, fiber diameter, *might be* determined, it does not follow that the fiber diameter would have been obvious in the present claimed invention, nor does that mean other parameters would have been necessarily, inevitably inherent in the cited prior art.

The prior art lacuna with respect to those claim elements cannot be worded-over with incantation of "routine experimentation" or "optimization" since words alone cannot substitute for teachings missing from the art. Appellants respectfully submit that claim 1 refers to the polypropylene resins, a relationship between the different polypropylene resins (the formula) and the nucleating agent to obtain a recyclable composite. The relationship is important with respect to adhering the fibers and matrix resin so as to obtain structural integrity and to permit manufacturing the claimed composite. Specification at page 8. The composite, as stated herein, can redress the recycling problems associated with certain composites. Specification, page 2 (discussing problem with a prior art embodiment). Therefore, it is not "routine experimentation" to discover a solution undisclosed or nowhere suggested in the cited art. It is not "routine experimentation" or "optimization" when the relationship discovered is important and its selection leads to the solution, neither of which are explicated in the cited art. Indeed, the recitation of "routine experimentation" reflects a truncated analysis contravening 35 U.S.C. §103. *See, e.g., In re Fay*, 345 F.2d 594 (CCPA 1965) (reversing obvious rejection based on allegations of "routine experimentation"), and 35 U.S.C. §103(a) (last sentence).

Finally, although the Office Action presents an argument that it is known in the art that nucleating agents increase adhesiveness between the fibers and the matrix resins, Appellants respectfully submit the two applied references neither disclose nor would they have suggested that a person of ordinary skill in the art would have selected nucleating agents, selected the polypropylene resin for making reinforcing fibers and incorporate therein



the selected nucleating agent, distributed the reinforcing fibers in a different polypropylene matrix resin, and made the resin selections so that they would have the relationship recited in claim 1.

**b. Claim 2 would have been unobvious.**

According to claim 2, in the The fiber reinforced polypropylene-based composite material according to claim 1, wherein the polypropylene-based resin which is a material forming the reinforcing fibers is a propylene homopolymer having a melting point,  $T_m(F)$ , of not lower than 155°C or a copolymer of propylene and ethylene and/or  $\alpha$ -olefin having 4 or more carbon atoms. or a copolymer of propylene and ethylene and/or  $\alpha$ -olefin having 4 or more carbon atoms.

The present specification discloses the such materials are preferred from the viewpoint of improved mechanical properties of the claimed composite.

Claim 2 depends from claim 1 and would have been unobvious for the reasons stated above and for the following reasons. The prior art does not disclose nor would it have suggested the relationship in claim 1 would be satisfied with reinforcing fibers obtained from either a propylene homopolymer having a melting point,  $T_m(F)$ , of not lower than 155°C or with a copolymer of propylene and ethylene and/or  $\alpha$ -olefin having 4 or more carbon atoms.

**c. Claims 4, 5 and 6 would have been unobvious.**

Claims 4, 5 and 6 depend from claim 1. Claim 4 recites the fiber reinforced polypropylene-based composite material according to claim 1, wherein the reinforcing fibers are mixed or inserted to the matrix resin in the form of a knitted fabric, a woven fabric or a fleece. Claim 5 recites the fiber reinforced polypropylene-based composite material according to claim 1, wherein the reinforcing fibers are mixed or inserted to the matrix resin with being oriented in a single direction. Claim 6 recites the fiber reinforced polypropylene-based composite material according to claim 1, wherein the reinforcing fibers have an average fiber diameter of from 6 to 100  $\mu\text{m}$ .

Claim 4 would have been unobvious to a person of ordinary skill in the art for reasons stated above and for the further reason(s) that the Yagi et al. reference would not have suggested the polypropylene resin for making the reinforcing fibers, and therefore would not have suggested mixing or inserting the polypropylene reinforcing fibers into the matrix resin, provided the polypropylene fibers are in the form of a knitted fabric, a woven fabric or a fleece. It is not seen where the above discussed omissions in the Yagi reference would have been supplied by the Nakajima reference, even assuming their combination, which combination is not conceded.

Claim 5 would have been unobvious to a person of ordinary skill in the art for reasons stated above and for the further reason(s) Yagi et al. reference would not have suggested the polypropylene resin for making the reinforcing fibers, and therefore would not have suggested mixing or inserting the polypropylene reinforcing fibers into the matrix resin, nor would have suggested that the polypropylene fibers be oriented in one direction. Orienting the fibers will confer or promote certain mechanical properties in the composite and this would appear to be a teaching absent from the Yagi reference. It is not seen where the above discussed omissions in the Yagi reference would have been supplied by the Nakajima reference, even assuming their combination, which combination is not conceded.

Claim 6 would have been unobvious to a person of ordinary skill in the art for reasons stated above and for the further reason(s) Yagi et al. reference would not have suggested the polypropylene resin for making the reinforcing fibers, and therefore would not have suggested mixing or inserting the polypropylene reinforcing fibers into the matrix resin, nor would have suggested that the polypropylene fibers have certain diameters of 6 to 100  $\mu\text{m}$ . It is not seen where the above discussed omissions in the Yagi reference would have been supplied by the Nakajima reference, even assuming their combination, which combination is not conceded.

**(9) Conclusion**

Appellants respectfully, but earnestly, request the Board to reverse the rejections of record.

Respectfully submitted,

FITCH, EVEN, TABIN & FLANNERY

By: 

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## APPENDIX

### Claims on Appeal

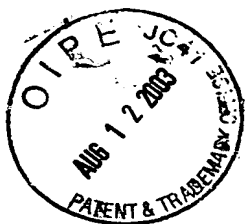
1. A fiber reinforced polypropylene-based composite material comprising reinforcing fibers and a matrix resin, wherein the reinforcing fibers and the matrix resin are made of different polypropylene-based resins, wherein a melting point,  $T_m(F)$ , of the polypropylene-based resin which is the material forming the reinforcing fibers and a melting point,  $T_m(M)$ , of the polypropylene-based resin which is the matrix resin satisfy  $T_m(F) - T_m(M) > 10^\circ\text{C}$ , and wherein a nucleating agent is added to the polypropylene-based resin which is the material forming the reinforcing fibers.

2. The fiber reinforced polypropylene-based composite material according to claim 1, wherein the polypropylene-based resin which is a material forming the reinforcing fibers is a propylene homopolymer having a melting point,  $T_m(F)$ , of not lower than  $155^\circ\text{C}$  or a copolymer of propylene and ethylene and/or  $\alpha$ -olefin having 4 or more carbon atoms.

4. The fiber reinforced polypropylene-based composite material according to claim 1, wherein the reinforcing fibers are mixed or inserted to the matrix resin in the form of a knitted fabric, a woven fabric or a fleece.

5. The fiber reinforced polypropylene-based composite material according to claim 1, wherein the reinforcing fibers are mixed or inserted to the matrix resin with being oriented in a single direction.

6. The fiber reinforced polypropylene-based composite material according to claim 1, wherein the reinforcing fibers have an average fiber diameter of from 6 to  $100\text{ }\mu\text{m}$ .



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2011 South Clark Place  
Customer Window, Mail Stop Appeal Brief - Patents  
Crystal Plaza Two, Lobby, Room 1B03  
Arlington, VA 22202

Dear Sir:

In accordance with 37 C.F.R. § 1.192, Brief on Appeal in triplicate.

The items checked below are appropriate:

1. **Status of**

This application is on behalf of ☒ other than a small entity or ☐ a small entity.

The verified statement ☐ is attached or ☐ was filed on .

2. **Fee For Filing Brief On Appeal**

Pursuant to 37 C.F.R. § 1.17(e), the fee for filing the Brief on Appeal is for:  
☒ other than a small entity or ☐ a small entity.

08/13/2003 JADD01 00000114 061135 09671301

01 FC:1402 320.00 DA

**Brief Fee Due: \$320.00**

**3. Oral Hearing**

☐ an oral hearing in accordance with 37 C.F.R. § 1.194.

**4. Extension of Time**

The proceedings herein are for a patent application and the provisions of 37 C.F.R. § 1.136 apply.

☐ for a extension of time under 37 C.F.R. § 1.136, the fee for which is \$.

☒ that **no** extension of time is required. However, this conditional petition is being made to provide for the possibility that inadvertently overlooked the need for a petition and fee for extension of time.

**Extension fee due with this request: \$0.00**

**5. Total Fee Due**

The total fee due is:

Brief on Appeal Fee	\$320.00
Request for Oral Hearing	\$
Extension Fee (if any)	\$

**Total Fee Due: \$320.00**

**6. Fee Payment**

☐ Attached is a check in the sum of \$ .

☒ Charge Account No. 06-1135, under Order No. 7372/70931, the sum of \$320.00. A duplicate of this transmittal is attached.

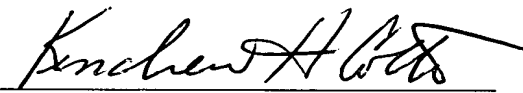
**7. Fee Deficiency**

- If any additional fee is required in connection with this communication, charge Account No. 06-1135. A duplicate copy of this transmittal is attached.

Respectfully submitted,

FITCH, EVEN, TABIN & FLANNERY

By:



Kendrew H. Colton

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